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## C-A OPERATIONS PROCEDURES MANUAL

### 7.1.35 Reactivation of Regeneration System

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#### Hand Processed Changes

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Approved: \_\_\_\_\_ *Signature on File* \_\_\_\_\_  
Collider-Accelerator Department Chairman Date

S. Sakry

### **7.1.35 Reactivation of Regeneration System**

#### **1. Purpose**

- 1.1 To provide instruction on reactivation of the Regeneration (Regen) system.
- 1.2 The Regen System consists of the skid, including dryer towers, and the distribution manifold.

#### **2. Responsibilities**

- 2.1 The shift supervisor or an operator designated by the shift supervisor is responsible for conducting the procedure and providing documentation in the cryogenic control room log.
- 2.2 Should a problem arise in the process of installing or removing an expander braking system, the shift supervisor shall report to the technical supervisor for instructions before continuing.
- 2.3 The technical supervisor shall report all problems to the appropriate engineer.

#### **3. Prerequisites**

- 3.1 Pure helium system available.
- 3.2 Nitrogen instrumentation compressor operating.
- 3.3 If Regen skid or distribution manifold is to be evacuated and back filled, the Regen System must be shut down.
- 3.4 If a dryer tower is to be reactivated, that tower must be off line.

#### **4. Precautions**

If there is liquid in the refrigerator pots, all personnel entering the refrigerator wing of Bldg. 1005R must be ODH Class1 qualified, have a Personal Oxygen Monitor (POM) and carry an emergency escape pack.

#### **5. Procedure**

##### **5.1 General**

- 5.1.1 Ensure closed 110 VAC circuit breakers 25 \_\_\_\_ 27 \_\_\_\_ and 29 \_\_\_\_ in panel RP-2 (located next to CB3 and CB5 calorimeter local control panels).

5.1.2 Ensure closed 480 VAC circuit breakers 1 \_\_\_\_ and 2 \_\_\_\_ on subsection F (panel located on east wall of lower level).

5.2 Reactivation of Dryer Tower "A"

\_\_\_\_ 5.2.1 Date\_\_\_\_\_.

\_\_\_\_ 5.2.2 Ensure the following valves are closed:

H6105M____	H6202M____
H6102M____	H6140M____
H6103M____	N645M____
H6104M____	Helium Pump Out Valve____
H6207M____	Nitrogen Pump Out Valve____

\_\_\_\_ 5.2.3 Depressurize tower "A" by opening valves N646m\_\_\_\_ and H6106M\_\_\_\_.

\_\_\_\_ 5.2.4 Align N<sub>2</sub> purge by opening valves H6104\_\_\_\_ and N6200M\_\_\_\_.

\_\_\_\_ 5.2.5 Start purge by throttling valve H6202M for a flow at approximately 60 scfm, as read on N<sub>2</sub> flow meter FI6201N.

\_\_\_\_ 5.2.6 Depress "System control Reset" button on Regen skid control panel.

\_\_\_\_ 5.2.7 Set left temperature switch to 265°F (first mark above 250°).

\_\_\_\_ 5.2.8 Place flow switch selector to "Flow Switch 1 On" (N<sub>2</sub>).

\_\_\_\_ 5.2.9 Place tower reactivation selector switch to "LT Reactivation."

\_\_\_\_ 5.2.10 Place control circuit selector switch to "On."

\_\_\_\_ 5.2.11 The heater circuit will automatically cycle on and off to maintain temperature at 265°F. After approximately six hours, stop the heating cycle by placing the control circuit selector switch to "Off."

\_\_\_\_ 5.2.12 Stop N<sub>2</sub> purge by closing valves N6200M\_\_\_\_ and H6106M\_\_\_\_.

\_\_\_\_ 5.2.13 Start vacuum pump and open N<sub>2</sub> pump out valve.

\_\_\_\_ 5.2.14 Fully open valve H6202M.

\_\_\_\_ 5.2.15 After tower "A" has pumped down, close N<sub>2</sub> pump out valve\_\_\_\_ and valve N618M\_\_\_\_.

- \_\_\_\_\_ 5.2.16 To align for helium back fill of tower “A,” open valves N651\_\_\_\_\_ and H647M\_\_\_\_\_.
- \_\_\_\_\_ 5.2.17 Back fill tower “A” through valve H6102M and close valve.
- \_\_\_\_\_ 5.2.18 Open N<sub>2</sub> pump out valve.
- \_\_\_\_\_ 5.2.19 After tower “A” has pumped down, close pump out valve\_\_\_\_\_ and valve H6202M\_\_\_\_\_ and stop pump.
- \_\_\_\_\_ 5.2.20 Back fill tower “A” through valve H6102M, leave valve “cracked” open.
- \_\_\_\_\_ 5.2.21 To start helium purge, open valve H6106M\_\_\_\_\_ and throttle valve H6102M\_\_\_\_\_.
- \_\_\_\_\_ 5.2.22 After purging for approximately 15 minutes, close valve H6106M\_\_\_\_\_ and pressurize tower “A” to approximately 200 psig.
- \_\_\_\_\_ 5.2.23 Close the following valves:
- |             |            |
|-------------|------------|
| H6102M_____ | N646M_____ |
| H6104M_____ | N651M_____ |
| H647M_____  |            |
- \_\_\_\_\_ 5.2.24 Open valve N618M.

### 5.3 Reactivation of Dryer Tower “B”

- \_\_\_\_\_ 5.3.1 Date\_\_\_\_\_.
- \_\_\_\_\_ 5.3.2 Ensure the following valves are closed:
- |             |                              |
|-------------|------------------------------|
| H6205M_____ | H6142M_____                  |
| H6202M_____ | H6104M_____                  |
| H6139M_____ | N645M_____                   |
| H6106M_____ | Helium Pump Out Valve_____   |
| H6102M_____ | Nitrogen Pump Out Valve_____ |
- \_\_\_\_\_ 5.3.3 Depressurize tower “B” by opening valves N646M\_\_\_\_\_ and H6207M\_\_\_\_\_.
- \_\_\_\_\_ 5.3.4 Align N<sub>2</sub> purge by opening valves H6140M\_\_\_\_\_ and N6200M\_\_\_\_\_.

- \_\_\_\_\_ 5.3.5 Start purge by throttling valve H6202M for a flow of approximately 60 scfm, as read on N<sub>2</sub> flow meter FI6201N.
- \_\_\_\_\_ 5.3.6 Depress “System Control Reset” on Regen skid control panel.
- \_\_\_\_\_ 5.3.7 Set right temperature switch to 265°F (first mark above 250°).
- \_\_\_\_\_ 5.3.8 Place flow switch selector to “Flow Switch 1 On” (N<sub>2</sub>).
- \_\_\_\_\_ 5.3.9 Place tower reactivation selector switch to “RT Reactivation.”
- \_\_\_\_\_ 5.3.10 Place control circuit selector switch to “On.”
- \_\_\_\_\_ 5.3.11 The heater circuit will automatically cycle on and off to maintain temperature at 265°F. After approximately six hours, stop the heating cycle by placing the control circuit selector switch to “Off.”
- \_\_\_\_\_ 5.3.12 Stop N<sub>2</sub> purge by closing valves N6200M\_\_\_\_\_ and H6207M\_\_\_\_\_.
- \_\_\_\_\_ 5.3.13 Start vacuum pump and open N<sub>2</sub> pump out valve.
- \_\_\_\_\_ 5.3.14 Fully open valve H6202M.
- \_\_\_\_\_ 5.3.15 After tower “B” has pumped down, close N<sub>2</sub> pump out valve\_\_\_\_\_ and valve N618M\_\_\_\_\_.
- \_\_\_\_\_ 5.3.16 To align for helium back fill of tower “B,” open valves N651M\_\_\_\_\_ and H647M\_\_\_\_\_.
- \_\_\_\_\_ 5.3.17 Back fill through valve H6102M and close valve.
- \_\_\_\_\_ 5.3.18 Open N<sub>2</sub> pump out valve.
- \_\_\_\_\_ 5.3.19 After tower “B” has pumped down, close pump out valve\_\_\_\_\_ and valve H6202M\_\_\_\_\_.
- \_\_\_\_\_ 5.3.20 Back fill tower “B” through valve H6102M, leave valve cracked open.
- \_\_\_\_\_ 5.3.21 to start helium purge, open valve H6207M\_\_\_\_\_ and throttle valve H6102M.
- \_\_\_\_\_ 5.3.22 After purging for approximately 15 minutes, close valve H6207M\_\_\_\_\_ and pressurize tower “B” to approximately 200 psig.

\_\_\_\_\_ 5.3.23 Close the following valves:

H6102M\_\_\_\_\_

N646M\_\_\_\_\_

H6140M\_\_\_\_\_

N651M\_\_\_\_\_

H647M\_\_\_\_\_

\_\_\_\_\_ 5.3.24 Open valve N618M.

## 6. **Documentation**

6.1 The check-off lines on the procedure are for place keeping only. The procedure is not to be initialed or signed, it is not a record.

6.2 The Shift Supervisor shall document the completion of the procedure in the Cryogenics Control Room Log.

## 7. **References**

7.1 Drwg. 3A995060, Regeneration System

7.2 Drwg. 3A995009, 25 kW Helium Refrigerator P&ID

## 8. **Attachments**

None